Cisco

The Power of 5G for the Connected Future

By Matt Price, VP, Cisco Engineering

Trains, planes, automobiles... they all move fast – their network should, too.

Transportation systems depend on a strong, secure network – drivers, passengers, employees and even autonomous operations all rely on it.

5G connectivity is key to unlocking next-gen transportation networks and applications. Given the critical importance of safety in the transportation ecosystem, in addition to ensuring a seamless user experience, having ubiquitous and extremely reliable connectivity is mission critical. Managing multi-access technologies such as public 5G, private 5G, and Wi-Fi will play a pivotal role in ensuring reliable and secure connectivity across transportation use cases.

Traditional networks forced data back to centralised nodes, which increased latency by being further away from where the data originated. With 5G, these nodes can now be decentralised and distributed in cloud deployments, bringing applications and the internet closer to the vehicle and allowing unprecedented low-latency connectivity. Additionally, 5G provides improved security to aid car manufacturers and fleet managers to meet connected vehicle application security requirements.

Next-Gen Experiences in the Connected Car

The connected car has evolved since the early days of sending a signal once the vehicle was in an accident. Today's connected vehicle has become a bidirectional communicational channel. It needs to be able to communicate with the internet, other vehicles, roadways, intersections and more for traffic, safety and even entertainment use cases. Automotive OEMs must navigate how to seamlessly move a vehicle between environments, using multiple access technologies, and maintain network visibility, control and reporting.

Connected cars are the most sophisticated Internet of Things (IoT) devices today with use cases (onboard applications or services) ranging from notifying drivers of upcoming road hazards, emergency vehicles or pedestrians in intersections, to telematics services that enable predictive maintenance of vehicle components, infotainment services to enable audio and video streaming apps (Netflix, Spotify), on-board Wi-Fi, high-definition maps and a marketplace for retail use cases.

In addition to these use cases, OEMs are looking at 5G as a critical enabler for autonomous driving with V2X services – where the car communicates with neighbouring vehicles, roadway infrastructure and an edge cloud – which requires periodic mapping updates and predictive intelligence with automated assurance to detect service anomalies and drive corrective actions. Additionally, software-defined vehicles require frequent software updates (FOTA/SOTA) which require reliable, high-bandwidth connectivity.

Webex integration is another application that OEMs are choosing to enable as a new service for their customers by making their vehicle a mobile connected office. **Ford** and **Mercedes Benz AG's** recent partnerships with

Infotainment and Wi-Fi Hotspots	Telematics	FOTA / SOTA	Insurance UBI & OEM-Branded	Predictive Maintenance	Electrification	V2X for Autonomous Driving
OEMs can sell infotainment services using vehicle as a channel.	Fleet management with telematics.	Mission-critical remote firmware and software updates. Cost reduction by preventing / accelerating recalls. Monetise new software-based features.	Monetisation opportunity to sell services based on driver behaviour and usage.	Predictive intel on repairs / maintenance. Eliminate cycle of downtime. Monetise vehicle data with data sharing.	Electric vehicle (EV) charging. Vehicle-to-grid (V2G) charging. Monetise value-added services, i.e. Wi-Fi hotspots, digital advertising.	Real-time monitoring of connected components. Monitor, communicate and respond to vehicle, pedestrian and infrastructure elements. Monetise software updates with subscriptions.

Figure 1. *Connected vehicle 5G-enhanced use cases*

Cisco to enable **Webex Meetings and Calling** in their vehicles pave the way for mainstream adoption by other OEMs.

Commercial vehicle (CV) OEMs are also leading adoption of autonomous trucking (AT) technologies and building homegrown fleet management solutions. Pervasive connectivity with edge deployments supporting mission critical V2X communications is a pre-requisite for CV OEMs to embrace autonomous trucking. Platooning, considered to be the first commercial AT application, is expected to generate TCO savings of ~45% by the end of this decade. Fleet management solutions for electrified, autonomous trucks will subsequently leverage 5G connectivity for predictive diagnostics and maintenance of vehicle components and powertrain. **Figure 1** has an overview of connected vehicle 5G-enhanced use-cases.

Cisco's Vision for a 5G Connected Transportation Future

To achieve this vision of a 5G connected future in transportation, we are enabling vehicle OEMs to take the control needed to deliver a safer and more

sustainable fleet. That requires deep integration with networks and a deep understanding of the quality of service (QoS) that comes from it.

QoS becomes critical for services that depend on specific characteristics or SLAs like safety or autonomous driving. OEMs need to know how vehicles are performing, and to be able to address issues as they arise, not open a ticket with their communications service provider (CSP) and wait for a response. They need a framework where CSPs allow them certain control and configuration privileges, like applying a slice to a network service or deploying additional edge nodes when capacity dictates they are needed.

This level of control will allow OEMs to provide unique customer experiences, with a reliable QoS to deliver their services. The car becomes a digital extension of the passenger's journey, whether it's a privately owned vehicle or a shared mobility service. And this goes beyond the connected car.

OEMs and municipalities must work together to build intelligent systems that will power the connected roads and corridors. They must learn how to bring disparate sources of data together, process them into intelligent decisions and then feed that information back to drivers or infrastructure that can act upon it.

The next generation of both cars and networks will change transportation and mobile networks in ways we can't even fathom yet. But unless you have a strategy for how to bring these two together, you will struggle to unlock the power that is just at our fingertips.

Scott Lantis

slantis@cisco.com

cisco.com


Between the future of transportation and the secure infrastructure that connects it,
there's a bridge.
Cisco has a rich history of delivering exceptional transportation results worldwide. We've worked with over 32,000 transportation customers in 169 countries to help them transform operations and power inclusive, safe, efficient transportation for all.
Cisco portfolio for transportation:
What can we help you solve today?
CISCO
The bridge to possible